

Name _____

Sex-linked Crosses

One of the important genes carried on the X chromosome is responsible for normal color vision. The dominant allele (N) produces normal color vision. The recessive allele (n) causes colorblindness.

- Write the genotypes of the parents
- Show the cross in a Punnett square
- List the genotypic and phenotypic ratios
- Determine the probabilities indicated

1. Cross a colorblind male with a homozygous normal female. ♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

A normal female _____

A normal male _____

A colorblind female _____

A colorblind male _____

2. Cross a colorblind male with a heterozygous normal female. ♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

Normal _____

Colorblind _____

Probability a male offspring would be:

Normal _____

Colorblind _____

Probability a female offspring would be:

Normal _____

Colorblind _____

3. Cross a normal male with a colorblind female.

♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

A normal female _____

A normal male _____

A colorblind female _____

A colorblind male _____

4. Cross a normal male with a heterozygous normal female.

♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

Normal _____

Colorblind _____

Probability a male offspring would be:

Normal _____

Colorblind _____

Probability a female offspring would be:

Normal _____

Colorblind _____

5. Is colorblindness more common in males or females? Why?

Hemophilia is a serious sex-linked disorder in humans resulting in failure of the blood to clot properly. It is transmitted by a recessive allele (h) on the X chromosome. A mother who is $X^H X^h$ is considered a carrier of hemophilia, but does not have hemophilia herself.

- Write the genotypes of the parents
- Show the cross in a Punnett square
- List the genotypic and phenotypic ratios
- Determine the probabilities indicated

1. Cross a normal male with a heterozygous normal female (carrier). ♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

A normal female _____

A normal male _____

A female with hemophilia _____

A male with hemophilia _____

2. Cross a male with hemophilia with a homozygous normal female. ♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

Normal _____

A hemophiliac _____

Probability a male offspring would be:

Normal _____

A hemophiliac _____

Probability a female offspring would be:

Normal _____

A hemophiliac _____

3. Cross a male with hemophilia with a heterozygous normal female (carrier). ♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

A normal female _____

A normal male _____

A female with hemophilia _____

A male with hemophilia _____

4. Cross a normal male with a female with hemophilia.

♂ _____ X _____ ♀

Genotypic ratio:

Phenotypic ratio:

Probability of having a child who is:

Normal _____

A hemophiliac _____

Probability a male offspring would be:

Normal _____

A hemophiliac _____

Probability a female offspring would be:

Normal _____

A hemophiliac _____